

## CLAIMS

## WE CLAIM AS OUR INVENTION:

1. A hand brake alarm apparatus comprising:  
 a detector for producing an alarm signal when a drive motor of a locomotive is  
 5 energized coincident with a hand brake being engaged; and  
 a hand brake position alarm responsive to the alarm signal.
2. The apparatus of claim 1, further comprising:  
 a multiunit communication wheel slip circuit comprising a wheel slip indicator  
 10 in each of a plurality of locomotives;  
 a multiunit communication general alarm circuit comprising a general alarm  
 indicator in each of the plurality of locomotives; and further comprising  
 a hand brake position alarm in each of the plurality of locomotives, each hand  
 brake position alarm comprising the wheel slip indicator and the general alarm  
 15 indicator of the respective locomotive.
3. A hand brake position alarm for a locomotive, the alarm comprising:  
 a wheel slip indicator;  
 a general alarm indicator;  
 20 a hand brake position detection device for providing a hand brake engaged  
 signal;  
 a reverser position detection device for providing a reverser position signal;  
 and  
 a logic device having the hand brake engaged signal and the reverser position  
 25 signal as inputs and having outputs connected to the wheel slip indicator and the  
 general alarm indicator.

4. In a locomotive consist having a master locomotive and a slave locomotive interconnected by a multiunit communication line, a hand brake position alarm apparatus comprising;

a general alarm circuit of the multiunit communication line connected to a general alarm indicator in each of the master locomotive and the slave locomotive;

a wheel slip alarm circuit of the multiunit communication line connected to a wheel slip indicator in each of the master locomotive and the slave locomotive;

a master controller reverser position detector for producing a reverser position signal responsive to a position of a reverser in the master locomotive;

a hand brake position detection device for producing a hand brake position signal responsive to a position of a hand brake;

a logic device having the reverser position signal and the hand brake position signal as inputs and adapted to actuate the general alarm circuit and the wheel slip alarm circuit in response to simultaneous indications of the reverser being in a non-neutral position and the hand brake being in an engaged position.

5. A hand brake position indicating device for a multi-locomotive consist comprising:

a multiunit communication line general alarm circuit;

a multiunit communication line wheel slip alarm circuit;

a hand brake position detection device for producing a brake engaged signal;

a master controller reverser position detector for producing a reverser out of neutral signal; and

a means for energizing both the general alarm circuit and the wheel slip alarm circuit in response to coincident brake engaged and reverser out of neutral signals.

6. A method of alarming a hand brake of a rail vehicle, the method comprising:

detecting an alarm condition when a preparation is made to energize a drive motor coincident with a hand brake being engaged; and

providing an alarm indication in response to the alarm condition.

7. The method of claim 6, further comprising providing the alarm indication as a wheel slip indication coincident with a general alarm indication.

8. The method of claim 6, further comprising providing the alarm indication through a multiunit communication line interconnecting a plurality of locomotives for providing the alarm indication in each of the plurality of locomotives.

9. A method of alarming an engaged hand brake in a multi-locomotive consist, the method comprising:

providing a hand brake engaged signal in response to a hand brake being in an engaged position;

providing a master controller reverser out of neutral signal in response to a reverser being in an out-of-neutral position; and

simultaneously activating a multiunit communication line wheel slip alarm circuit and a multiunit communication line general alarm circuit in response to coincident hand brake engaged and reverser out of neutral signals.

10. A device for detecting the position of a rail vehicle hand brake, the device comprising:

a circuit comprising a switch for providing a brake engaged signal and an indicator responsive to the brake engaged signal;

a mechanism connecting the switch and a hand brake drive chain, the mechanism movable with the drive chain to operate the switch between an engaged position and a disengaged position; and

the mechanism defining a load path for supporting a weight of the drive chain bypassing the switch.

11. The device of claim 10, further comprising:  
 an anchor bracket connected to the rail vehicle;  
 a pivot arm connected to the drive chain and pivotally connected to the anchor bracket for movement with the drive chain;  
 the pivot arm further comprising a stop surface for contacting the anchor bracket when the pivot arm is in a stop position.

12. The device of claim 11, wherein the pivot arm comprises an upper stop surface for contacting the anchor bracket when the pivot arm is in a first stop position and a lower stop surface for contacting the anchor bracket when the pivot arm is in a second stop position.

13. The device of claim 10, wherein the circuit further comprises:  
 a locked axle indicator;  
 a master controller reverser position detector for producing a reverser position signal; and  
 a logic device having the reverser position signal and the brake engaged signal as inputs and adapted to energize the locked axle indicator when the reverser is in a non-neutral position and the hand brake is in an engaged position.

14. A rail vehicle hand brake position indicating device comprising:  
 a circuit comprising a switch and an indicator responsive to a position of the switch;  
 a hand brake drive chain movable from an engaged position to a disengaged position; and  
 a means for connecting the switch and the drive chain without supporting a weight of the drive chain through the switch.